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Williams, A.R.; Pena-Espinoza, Miguel Angel; Fryganas, Christos; Ropiak, H.M.; Ramsay, Aina; Mueller-Harvey, I.; Thamsborg, S. M.

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Williams, Andrew[1], *Peña, Miguel*[2], *Fryganas, Christos*[3], *Ropiak, Honorata*[3], *Ramsay, Aina*[3], *Mueller-Harvey,Irene*[3], *Thamsborg, Stig*[1]

[1]Department of Veterinary Disease Biology, University of Copenhagen, Denmark, [2] National Veterinary Institute, Technical University of Denmark, [3]SAPD, Reading University, UK.

BACKGROUND: Organic animal production presents challenges to animal health and productivity. In organic pig production, animals must have access to outdoor pastures which increases exposure to gastrointestinal parasites. Moreover, the routine use of synthetic anti-parasitic drugs is not allowed. Thus, novel parasite-control options are required. We present results from a comprehensive *in vitro* screen of plant secondary metabolites (PSM) from diverse plant sources on the economically important pig parasites *Ascaris suum* and *Oesophagostomum dentatum.*
METHODS: We focused on two PSM classes commonly found in natural diets – condensed tannins (CT) and sesquiterpene lactones (SL). Different CT-types were purified from various plant sources to reflect their diversity; SL were purified from forage chicory. These PSM were tested in inhibition assays of worm motility and migratory ability.
RESULTS: CT had potent activity against *A. suum*, with substantial inhibition of migration of *in vitro* hatched larvae (EC_{50} values ranging from 40 to 120 µg/mL). In contrast, migratory ability of *O. dentatum* larvae was not significantly affected. However, the motility of adult *O. dentatum* was reduced after *in vitro* incubation with CT. The purified chicory extract showed potent inhibition of *A. suum* larval migration (EC_{50} value of 42 µg/mL) and was also active against larval and adult stages of *O. dentatum.* Electron microscopy demonstrated significant structural damage to the cuticle and digestive tissues in nematodes exposed to PSM.
CONCLUSIONS: Plants rich in PSM such as CT and SL show promise as natural anthelmintics against two highly prevalent swine parasites. Experiments to determine *in vivo* efficacy and mechanisms of nematocidal action are on-going.